



## **A Quantitative Estimate of 'Eastern Washington Annual Haul Road Needs for Wheat and Barley Movements**

Washington State  
 University

IN COOPERATION WITH



WASHINGTON STATE  
DEPARTMENT OF TRANSPORTATION



# **A Quantitative Estimate of Eastern Washington Annual Haul Road Needs for Wheat and **Barley** Movements**

EWITS Research Report Number 6  
March, 1995

**by**

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## **EWITS Research Reports: Background and Purpose**

This is the sixth of a series of reports prepared from the Eastern Washington Intermodal Transportation Study (**EWITS**). The reports prepared as a part of this study provide information to help shape the multimodal network necessary for the efficient movement of both freight and people into the next century. This specific analysis was partially **funded** by the Washington Wheat Commission.

EWITS is a six-year study **funded** jointly by the Federal government and the Washington State Department of Transportation as a part of the **Intermodal Surface Transportation Efficiency** Act of 1991. Dr. Ken Casavant of Washington State University is Director of the study. A state-level Steering Committee provides overall direction pertaining to the design and implementation of the project. The Steering Committee includes Jerry Lenzi, Chairperson (WSDOT, Eastern Region); Richard Larson (WSDOT, South Central Region); Don Senn (WSDOT, North Central Region); Charles Howard (WSDOT, Planning Manager), and Jay Weber (Douglas County Commissioner). Linda Tompkins represents the Washington State Transportation Commission on the Steering Committee. An Advisory Committee with representation from a broad range of transportation interest groups also provides guidance to the study. The following are key goals and objectives for the Eastern Washington Inter-modal Transportation Study:

- *Facilitate existing regional and state-wide transportation planning efforts.*
- *Forecast future freight and passenger transportation service needs for eastern Washington.*
- *Identify gaps in eastern Washington's current transportation infrastructure.*
- *Pinpoint transportation system improvement options critical to economic competitiveness and mobility within eastern Washington.*

For additional information about the Eastern Washington **Intermodal** Transportation Study or this report, please contact Ken Casavant at the following address:

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## **DISCLAIMER**

The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Washington State Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

## **EWITS PREVIOUS REPORTS NOW AVAILABLE**

1. **Gillis**, William R. and Kenneth L. Casavant. EWITS Research Report Number 1. "Linking Transportation System Improvements to New Business Development in Eastern Washington." February 1994.
2. **Gillis**, William R. and Kenneth L. Casavant. EWITS Research Report Number 2. "Lessons from Eastern Washington: State Route Mainstreets, Bypass Routes and Economic Development in Small Towns." February 1994.
3. **Gillis**, William R. and Kenneth L. Casavant. EWITS Research Report Number 3. "Washington State Freight Truck Origin and Destination Study: Methods, Procedures and Data Dictionary." December 1994.
4. **Gillis**, William R. and Kenneth L. Casavant. EWITS Research Report Number 4. "Major Generators of **Traffic** on U.S. 395 North of Spokane: Including Freight Trucks and Passenger Vehicles Crossing the International Border." January 1995.
5. **Newkirk**, Jonathon R., Ken Eriksen and Kenneth L. Casavant. EWITS Research Report Number 5. "Transportation Characteristics of Wheat and Barley Shipments on Haul Roads To and From Elevators in Eastern Washington." March 1995.

## **ACKNOWLEDGEMENTS**

This study was partially funded by a grant from the Washington Wheat Commission.

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## Introduction

The history of Washington as a state, and especially eastern Washington as a region, is a history of the wheat industry. The economic rationale for rural community formation and infrastructure development was the support of and benefits **from** agricultural activity, particularly wheat production in the Pacific Northwest. The continuing level of state development and sustaining of that level is supported by a mature wheat industry, its associated service purchases and the wheat industry's access to world markets provided by an efficient and dynamic transportation system.

It is known that the wheat industry in Washington is one of the most productive wheat sectors, certainly on a per acre basis, in the U. S. A recent study done for the Washington Wheat Commission looked in great detail at the economic impact of the wheat industry ("Economic Contribution of the Wheat Industry to the Washington Economy", Roger **Coupal** and David Holland, WSU). The study estimated direct economic impacts from wheat production, transportation and storage, and milling activities.

Total industry production value was \$457 million, with transportation and handling charges adding another direct value of \$50 million in sales. The impact was further enhanced by \$33 million from flour sales and \$54 million in wheat program returns.

Indirect impacts, added to the above direct impacts, resulted in \$1.4 billion annually, indicative of a mature industry. Employment to the state of Washington from the wheat industry was over 27,200 jobs, directly and indirectly, in a year. And, this broad level of activity generated over \$80 million in tax revenues for Washington's local and state governments.

But, the importance of transportation in the wheat industry far transcends the \$50 million in sales. Without the transportation system to support the access to the world markets, the shrinkage of the economic value of the industry would be startling. Support of the transportation system is the same as supporting this wheat industry and its substantial contributions to the state's and region's economies.

This transportation system is under pressure, physically and financially. Railroad abandonment, waterway **drawdown** and road deterioration all contribute to a sense of urgency in detailing the needs of that system. The overall purpose of this study is to provide a detailed assessment of needs, specifically for the road system in eastern Washington. Although road needs includes redesign, truck lanes, reconfiguration, etc., this study looks solely and directly at the road deterioration from the normal wear and tear associated with movement of grains. Specific objectives were to:

- 1) Develop a methodology to determine the impacts on roads associated with normal, legal truck movement.
- 2) Identify road usage and support needed by county for wheat and barley movements in each county.
- 3) Quantify the overall annual road needs and accompanying investment required to support the industry.

## Methodology

The road impact estimates developed in this analysis are derived predominately from information obtained through an in-depth survey of eastern Washington grain elevators (see EWITS report #5). The survey provided information concerning the origin, destination and movement (and volume) of wheat and barley from farm to market and allowed investigation of the resultant road needs for each type of truck movement. This study analyzes four types of grain movement: 1) grain moving from elevator to river ports; 2) grain moving directly from farm to river ports; 3) grain moving from one elevator to another elevator; and 4) grain moving from farm to elevators. These movements should capture the majority of road needs to support grain movement in eastern Washington. It should be noted that any roads passing through a local jurisdiction such as a city are simply assigned to the category of road entering the city, whether it was a county or state roadway.

Road impact from the first type of grain movement from elevator to river port was calculated in the following manner. All elevators surveyed indicated the river port location to which they shipped wheat and barley and the amount of each that was shipped. They also were asked to indicate the route used to reach the river port; the majority of respondents provided detailed route information. Thus, to determine the amount of road need, each elevator was located on a map and the distance in miles was measured from the elevator to the river port, by county and road type, and the volume of wheat and barley was multiplied times the miles traversed to arrive at a **tonmile** estimate for county roads and state highways in each county. The **tonmiles** also included the weight of the trucks, assumed to weigh 12 tons and have a payload of 28 tons. The trucks were also assumed to return empty, thus making the effective truck weight on roads 24 tons.

These **tonmiles** estimates were then multiplied by a road damage coefficient of **\$.071** per **tonmile** for state highways and **\$. 1065** per **tonmile** for county roads in 1995. These **coefficients** were obtained from a previous research study by Ken Casavant and Jerry Lenzi titled "Procedure for Predicting and Estimating the Impact of Rail Line Abandonments on Washington Roads" in the WSDOT final report 1989. Denver Tolliver updated and calibrated these estimates for WSDOT and, with Casavant, these last **coefficients** were updated to 1995

("Washington Bail Impact Analysis: Executive Summary", Denver Tolliver, Kevin Andres and Brian Lindamood, WSDOT, December 1994). In the event that no route was provided by the elevator, the shortest and most direct route was chosen.

The road impacts from farm to river port movement were more challenging to obtain. The volume produced and the route taken to the river port were approximated by taking the average miles of county road and state highway used by elevators within each county transporting grain to river ports. The volume of wheat and barley moved from farm to river port was obtained by subtracting the amount handled by elevators within a county from the five year average production for that given county. The volume (including truck weights as before) was then multiplied by the average county miles to arrive at a **tonmile** estimate, similar to previous road type and county estimates. The assumption that miles of road traveled for farm to river port movement will be on average the same as elevator to river port movement is not too limiting since elevators are usually located in direct proportion to the intensity of grain production of a given region. However, the estimate of the volume of grain moved this way may not be entirely accurate since it abstracts from any grain that may move across county lines to be handled at elevators in adjoining counties.

Grain moving from elevator to elevator is typically being moved from an elevator which doesn't have access to rail or to a multi-car train loading facility to an elevator which does. Thus to arrive at the number of miles traveled for elevator to elevator movement, all elevator locations were identified on a map within each county as either having or not having a **multi-car** train loading facility and the distance in miles was measured between a sample of those elevators which did not, and those which did have multi-car loading facilities. The average miles of county road and state highway traveled by the sample of those elevators without loading facilities to those elevators which do was multiplied by the volume of grain (including truck weight) reported shipped to other elevators by those without multi-car loading facilities; this allowed a **tonmile** estimate by road type and county to be derived. Once again this method abstracts from any movement between elevators across, county lines.

The farm to elevator movement was calculated by first identifying all on-farm storage locations in eastern **Washington**, on a map, along with the elevators. The location of the **on-farm** storage facilities was obtained from county Agricultural Soil and Conservation Service **offices** and county assessor **offices**. Then, for each elevator it was determined which on-farm storage facilities would ship their grain to that elevator, assuming they ship to the closest elevator. Once which elevators each on-farm storage facility shipped their grain to were determined, the average miles of county road and state highway traversed by farmers transporting grain to the elevator was calculated. The average distances were determined by selecting a sample of on-farm storage locations for each elevator, measuring the distance between the **on-farm** storage location and the elevator and then taking the average. In the event where there were only a few on-farm storage locations shipping to an elevator, each were included in the average mileage estimates. The volume of grain handled at each elevator, and the weight of the trucks used for transporting the grain, were multiplied by the

average mileage **from** the **farms** to the elevators to arrive at a **tonmile** estimate. These **tonmiles** were then multiplied by the road damage coefficients for **county** roads and state highways previously mentioned to determine a dollar value for highway need. Grain shipments from farm to elevator were assumed to move to the closest elevator within the county. Therefore, no grain moved across county boundaries en route to the elevators. While this may seem somewhat unrealistic, overall the highway impact **from** grain which would cross county lines to reach the closest elevator will be off-setting since grain could reasonably be expected to move in both directions across the county line.

## Results

Results of this analysis are presented in this section. What is quickly evident is the **significant** variation among the counties in magnitude of road impacts by type of movement. As detailed in the methodology discussion the four general possible -movement types are: farm to river port, farm to elevator, elevator to river port and elevator to elevator. These types of movements are summarized by type of road and total impact in Tables I and II.

Investment needs of about \$27.5 million a year will be required to maintain the haul road system needed to support the wheat and barley industry. Of this, the vast majority of the impact, \$16.5 million or **60%**, occurred in farm to river port movement. Elevator to river port movement caused over \$8.1 million or 29.5% of the total impact. Elevator to elevator movements were associated with less than 2% of the wear and tear; farm to elevator caused about \$2.5 million or 8.8% of the total investment need.

The incidence of these road needs offers information for investment strategies by local and state decision makers. Almost 81 percent or \$22.2 million of the impact is felt by state highways. County roads receive the other 19.3 percent or \$5.3 million of impact.

The incidence of impact does vary significantly by type of movement (Tables I and II). Any movement to the river port, whether from elevator or farm, has a **heavy** impact on state highways (83% and **89.2%**, respectively). Elevator to elevator movements are the most even in distribution across county road and state highway. Grain movements from **farm** to elevator occur almost 79% of the time on county roads, with only 21.3% on state highways. This overall distribution reflects the longer haul movements to river ports being on state highways and the shorter haul movements occurring on collector county roads.

An in-depth examination of the above aggregate road needs for each county was also done for each of the thirteen counties in eastern Washington which reported elevator movements. The specific data on road needs for each county's movement are detailed in Appendices A and B. The share of each county in total **road** investment needs is indicated in Tables III and IV. These tables detail the amount of road needs caused by the grain produced in each county,

whether it occurs in that home county or in counties it crosses as it moves to market. Lincoln and Whitman counties, 26 and 19 percent or \$7 and \$5.2 million respectively, cause the largest amount of required road investment, followed by Grant and Adams. The southeastern, counties, along with **Benton** and Stevens counties, are the source of least impact on roads.

-Table I. Annual Road needs for All 13 Eastern Washington Counties from Wheat and Barley by Movement and Road Type, in dollars.

Movement	County Road	State Highway	Total
Elevator to River Port	1,382,331	6,733,075	8,115,406
Farm to River Port	1,788,020	14,712,395	16,500,415
Elevator to Elevator	229,113	252,914	482,026
Farm to Elevator	1,931,388	525,714	2,457,103
Total	5,330,852	22,224,098	27,554,950

Table II. Annual Road needs for All 13 Eastern Washington Counties from Wheat and Barley by Movement and Road Type, by percentage.

Movement	County Road	State Highway	Total
Elevator to River Port	17.0	83	29.5
Farm to River Port	10.8	89.2	59.9
Elevator to Elevator	47.5	52.5	1.7
Farm to Elevator	78.6	21.3	8.8
Total	19.3	80.7	100

Table III. Total Road Needs in Eastern Washington to **support** Each Counties Production of Wheat and **Barley**, in dollars.

County	County Road	State Highway	Total
Adams	613,990	<b>2,294,031</b>	<b>2,908,021</b>
<b>Benton</b>	36,213	622,727	658,940
Columbia	248,062	408,833	656,896
Douglas	241,928	<b>2,280,652</b>	2522,580
<b>Franklin</b>	127,822	816,031	<b>943,853</b>
Garfield	<b>294,243</b>	<b>132,190</b>	426,433
<b>Grant</b>	358,846	<b>2,709,518</b>	<b>3,068,364</b>
<b>Lincoln</b>	<b>1,036,216</b>	<b>6,042,124</b>	<b>7,078,340</b>
<b>Spokane</b>	<b>460,652</b>	<b>1,063,315</b>	1523,967
Stevens	4,364	124,555	128,917
<b>Walla Walla</b>	570,371	1,552,510	<b>2,122,881</b>
Whitman	<b>1,265,690</b>	<b>3,888,210</b>	<b>5,153,900</b>
<b>Yakima</b>	72,455	289,404	361,858
Total	<b>5,330,852</b>	<b>22,224,098</b>	<b>27,554,950</b>

Table IV. Total Road Needs in Eastern Washington to support Each Counties Production of Wheat and Barley, by Percentage.

County	County Road	State Highway	Total
<b>Adams</b>	21.1	78.9	10.6
<b>Benton</b>	5.5	94.5	2.4
<b>Columbia</b>	37.8	62.2	2.4
<b>Douglas</b>	9.6	90.4	9.2
<b>Franklin</b>	13.6	86.4	3.4
<b>Garfield</b>	69.0	31.0	1.6
<b>Grant</b>	11.7	88.3	11.1
<b>Lincoln</b>	14.6	85.4	25.7
<b>Spokane</b>	30.3	69.7	5.5
Stevens	3.0	96.0	.5
<b>Walla Walla</b>	26.9	73.1	7.7
Whitman	24.6	75.4	18.7
Yakima	19.9	80.1	1.2
Total	19.3	80.7	100

County and state planners developing road investment strategies are faced with differing needs. As detailed in Tables III and IV, counties range from having 69% of their impact caused by their grain production occurring on county roads (Garfield) to 3% in Stevens county. Stevens county's movements are almost entirely (96%) on state highways while 86.4% of road impacts for Franklin county are on those state highways. The largest total dollar impact arose in Lincoln and Whitman county. **Benton**, Douglas and Stevens all saw over 90% of their road impact occur on state highways. Each county's configuration, location and road system determines the use, and magnitude of that use, of alternative road systems.

The above analysis detailed the road impacts and resulting investment needs caused by the grain produced in that county. The amount of road impacts occurring in each county, no matter the source of the grain itself, is summarized in Tables V and VI. In this approach those roads that receive and move grain across a county, usually state highways, require more investment than the roads simply originating that grain volume; such roads can be expected to be located in counties with or on the routes to river ports.

The above hypothesis is supported by the results of the analysis. Lincoln, Adams, Grant and Whitman counties do **have** that characteristic and a large amount of internal production. These four counties account for over 60 percent (\$16.6 million) of the road needs to support wheat and barley movement in eastern Washington. Those counties with low production and no cross shipments have a small share of the impacts eg. Stevens, Garfield and Spokane. This is supported by comparing Tables **IV** and VI. The larger amounts in Table VI reflect the volume of cross shipments; Adams, Franklin, Grant and **Garfield** significantly increased their road investment needs by hauling other counties' products to the market. Most of that increase occurred on state highways.

Table V. Total Road Needs Occurring in Each County, in dollars.

County	County Road	State Highway	Total
Adams	838,086	<b>4,721,542</b>	<b>5,559,628</b>
<b>Benton</b>	36,213	608,749	644,962
Columbia	248,063	408,833	656,896
Douglas	241,928	<b>427,316</b>	669,244
Franklin	127,822	<b>5,596,347</b>	<b>5,724,169</b>
<b>Garfield</b>	294,243	132,168	<b>426,411</b>
Grant	555,518	<b>4,381,475</b>	<b>4,936,993</b>
Lincoln	615,448	958,520	<b>1,573,970</b>
Spokane	396,474	72,014	468,488
Stevens	4,360	52,246	56,606
<b>Walla Walla</b>	570,371	<b>1,552,510</b>	2,122,881
Whitman	<b>1,329,869</b>	<b>3,261,475</b>	<b>4,591,344</b>
Yakima	72,454	50,902	123,357
Total	<b>5,330,849</b>	<b>22,224,098</b>	<b>27,554,950</b>

Table VI. Total Road Needs Occurring in Each County, by Percentage.

County	County Road	State Highway	Total
Adams	15.1	84.9	20.2
Benton	5.6	94.4	2.3
Columbia	37.8	62.2	2.4
Douglas	36.2	63.8	2.4
Franklin	2.2	97.8	20.8
Garfield	69.0	31.0	21.6
Grant	11.3	88.7	17.9
Lincoln	39.1	55.9	5.7
Spokane	84.6	15.4	1.7
Stevens	7.7	92.3	0.2
Walla Walla	26.9	73.1	7.7
Whitman	29.0	71.0	16.6
Yakima	58.7	41.3	.5
<b>Total</b>	<b>19.3</b>	<b>80.7</b>	<b>100</b>

### Summary

The wheat industry in Washington is one of the most productive wheat sectors in the U. S. Its economic impact on the state's economy is substantial to say the least: production value of \$457 million; \$50 million in transportation and handling; \$1.4 billion total direct and indirect value; 27,200 jobs in the economy. The industry requires a solid transportation system, road - rail - water, to access the critical international markets.

This analysis indicated annual road investment in eastern Washington of \$27.5 million is necessary to replace normal wear and tear on the road system. Almost \$22.2 million (81%) occurred on state highways and county roads received the other 19 percent of impact.

Most of the road needs occurs on movements to river ports; especially noticeable is that 89.2 percent of the impact on state highways occurs from farm to river port movement. However, farm to elevator movement generates 79 percent of its impacts on county roads.

Finally, it is evident that those counties serving as passage routes for **other** counties grain have a need for road investment far above that caused by their own production. This impact is felt directly by those counties near the river.

## **Appendix A**

### Adams County

#### **Movement I Elevator to River Port**

Table A-I-1 County Road and highway impacts from Wheat and Barley Originating within the County for **Elevator to River** Port Movement, in dollars.

county	County Road	State Highway	Total
Adams	197,851	575,959	773,810

Table A-I-2 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Adams County for **Elevator to River** Port Movement, in dollars.

County	County Road	State Highway	Total
Grant	0	176,030	176,030
Lincoln	58,886	410,983	469,869
Douglas	0	29,290	29,290
Whitman	0	200,222	200,222
Total	58,886	816,525	875,412

#### **Movement II Farm to River Port**

Table A-I-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Adams	113,512	416,194	529,706

Table A-I-4 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Adams County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Grant	0	304,026	304,026
Lincoln	165,210	1,512,076	1,677,286
Douglas	0	220,424	220,424
Whitman	0	811,071	811,070
Total	165,210	2,847,596	3,012,806

## Adams County

(continued)

### Movement *III* Elevator to Elevator

Table A-I-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator Movement, in dollars.**

County	County Road	State Highway	Total
Adams	59,213	34,114	93,327

### Movement *IV* Farm to Elevator

Table A-I-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator Movement, in dollars.**

County	County Road	State Highway	Total
Adams	243,414	31,153	274,567

### All Movements

Table A-I-7 Total Road needs to support Ail Wheat and **Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
Adams	838,086	4,721,542	5,559,628

## Benton County

### Movement *I* Elevator to River Port

Table A-II-1 County Road and highway impacts **from** Wheat and Barley Originating within the County for Elevator **to River Port** Movement, in dollars.

county	County Road	State Highway	Total
<b>Benton</b>	0	29,312	29,312

Table A-II-2 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through **Benton** County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	0	24,526	24,525

### Movement *II* Farm to River Port

Table A-II-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Benton</b>	0	382,417	382,417

Table A-II-4 Road impacts **from** Wheat and Barley Originating in Other Counties **and** Passing Through **Benton** County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	0	151,526	151,526

### Movement *III* Elevator to Elevator

Table A-II-5 Road impacts from Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
<b>Benton</b>	0	0	0

## Benton County

(continued)

### ***Movement IV*** Farm to Elevator

Table A-II-6 Road impacts **from** Wheat and Barley Originating within the **County** for **Farm** to Elevator Movement, in dollars.

county	County Road	state Highway	Total
<b>Benton</b>	36,213	20,969	57,182

### ***All*** Movements

Table A-II-7 Total Road needs to support All Wheat and **Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
<b>Benton</b>	36,213	608,749	644,962

## Columbia County

### ***Movement I*** Elevator to River Port

Table A-III-1 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Columbia	93,794	328,735	422,529

### ***Movement II*** Farm to River Port

Table A-III-3 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Columbia	35,144	63,267	98,410

### ***Movement III*** Elevator to Elevator

Table A-III-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Columbia	17,321	2,816	20,138

### ***Movement IV*** Farm to Elevator

Table A-III-6 Road impacts **from** Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Columbia	101,803	14,016	115,819

### ***All Movements***

Table A-III-7 Total Road needs to support All **Wheat and Barley Movement** within and Through the County, in dollars.

County	County Road	State Highway	Total
Columbia	248,063	408,833	656,896

## Douglas County

### Movement I Elevator to River Port

Table A-IV-1 County **Road** and highway impacts **from** Wheat and Barley Originating within the County for **Elevator to River Port** Movement, in dollars.

county	County Road	state Highway	Total
Douglas	11,212	48,001	59,214

### Movement II Farm to River Port

Table A-IV-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Douglas	165,318	336,934	502,252

### Movement III Elevator to Elevator

Table A-IV-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Douglas	0	0	0

### Movement IV Farm to Elevator

Table A-IV-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Douglas	65,398	42,381	107,778

### *All Movements*

Table A-N-7 Total Road needs to support **All Wheat and Barley Movement** within and Through the County, in dollars.

County	County Road	State Highway	Total
Douglas	241,928	427,316	669,244

# Franklin County

## **Movement I Elevator to River Port**

**Table A-V-1** County Road and highway impacts **from** Wheat and **Barley** Originating within the County for **Elevator** to River Port Movement, in dollars.

County	County Road	State Highway	Total
Franklin	14,855	120,228	135,083

**Table A-V-2** Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Franklin County for Elevator to River Port Movement, in dollars.

County	County Road	State Highway	Total
Adams	0	718,672	718,672
Benton	0	13,529	13,529
Douglas	0	75,318	75,318
Grant	0	476,404	476,404
Lincoln	0	187,565	187,565
Whitman	0	92,896	92,896
Yakima	0	8,703	8,703
Total	0	1,573,087	1,573,086

## **Movement II Farm to River Port**

**Table A-V-3** County Road and highway impacts **from** Wheat and **Barley** Originating within the County for **Farm** to River Port Movement, in dollars.

County	County Road	State Highway	Total
Franklin	81,028	686,271	767,300

## Franklin County

(continued)

Table A-V-4 Road impacts **from** Wheat and Barley Originating in Other Counties and Passing Through Franklin County for Farm **to** River Port Movement, in dollars.

County	County Road	State Highway	Total
Adams	0	517,939	517,938
Benton	0	176,500	176,500
Douglas	0	566,804	566,804
Grant	0	838,038	838,037
Lincoln	0	540,333	540,333
Whitman	0	513,849	513,849
Yakima	0	53,767	53,767
Total	0	3,207,229	3,207,229

### ***Movement III*** Elevator to Elevator

Table A-V-5 Road impacts **from** Wheat and Barley Originating within the County for Elevator **to** Elevator Movement, in dollars.

County	County Road	State Highway	Total
Franklin	0	0	0

### ***Movement IV*** Farm to Elevator

Table A-V-6 Road impacts **from** Wheat and Barley Originating within the County for **Farm to** Elevator Movement, in dollars.

County	County Road	State Highway	Total
Franklin	31,939	9,532	41,471

### ***AU*** Movements

Table A-V-7 Total Road needs to support **All** Wheat and **Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
Franklin	1 2 7 , 8 2 2	5,596,347	5,724,169

## Garfield County

### ***Movement I*** Elevator to River Port

Table A-VI-1 County Road and highway impacts **from** Wheat and Barley originating within the County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Garfield	0	49,446	49,446

### ***Movement II*** Farm to River Port

Table A-VI-3 County Road and highway impacts **from** Wheat and Barley originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Garfield	0	6,740	6,740

### ***Movement III*** Elevator to Elevator

Table A-VI-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Garfield	5,168	56,275	61,443

### ***Movement IV*** Farm to Elevator

Table A-VI-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Garfield	289,075	19,707	308,782

### *All Movements*

Table A-VI-7 Total Road **needs** to support **All Wheat and Barley Movement within** and Through the County, in dollars.

County	County Road	State Highway	Total
Garfield	294,243	132,168	426,411

## Grant County

### Movement I Elevator to River Port

Table A-VII-1 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Grant	58,339	305,398	363,737

Table A-VII-2 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Grant County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Douglas	0	120,741	120,741
Lincoln	11,570	94,518	106,088
Total	11,570	215,260	226,830

### ***Movement II*** Farm to River Port

Table A-VII-3 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Grant	51,095	513,122	564,217

Table A-VII-4 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Grant County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Douglas	0	840,759	840,759
Lincoln	185,102	2,410,437	2,595,539
Total	185,102	3,251,196	3,436,298

## Grant County

(continued)

### ***Movement III Elevator to Elevator***

Table A-VII-5 Road impacts **from** Wheat and Barley **Originating** within the County for Elevator to **Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Grant	25,168	62,322	87,489

### Movement IV ***Farm to Elevator***

Table A-VII-6 Road impacts from Wheat and Barley Originating within the County for Farm to Elevator Movement. in dollars.

County	County Road	State Highway	Total
Grant	224,244	34,178	258,422

### ***All Movements***

Table A-VII-7 Total Road needs to support **All Wheat and Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
Grant	555,518	<b>4,381,475</b>	<b>4,936,993</b>

## Lincoln County

### ***Movement I Elevator to River Port***

Table A-IIX-1 County Road and highway impacts from Wheat and Barley Originating within the County for **Elevator to River** Port Movement, in dollars.

County	County Road	state Highway	Total
<b>Lincoln</b>	107,192	189,594	296,696

Table A-IIX-2 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Lincoln County for **Elevator to River** Port Movement, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	0	3,461	3,461

### ***Movement II Farm to River Port***

Table A-IIX3 County Road and highway impacts **from** Wheat and Barley Originating within the **County** for Farm to River Port Movement, in dollars.

County	County Road	State Highway	Total
<b>Lincoln</b>	233,919	501,831	<b>735,751</b>

Table A-IIX-4 Road impacts **from** Wheat and Barley Originating in Other Counties and Passing Through Lincoln County for **Farm to River** Port Movement, in dollars.

county	County Road	State Highway	Total
<b>Stevens</b>	0	68,847	68,847

### ***Movement III Elevator to Elevator***

Table A-IIX-5 Road impacts **from** Wheat and Barley Originating within the County for Elevator to **Elevator** Movement. in dollars.

County	County Road	State Highway	Total
<b>Lincoln</b>	46,545	19,678	66223

## Lincoln County

(continued)

### Movement *IV* Farm to Elevator:

Table A-IIX-6 Road impacts **from** Wheat and Barley Originating within the County for **Farm** to Elevator Movement, in dollars.

county	County Road	state Highway	Total
Lincoln	227,792	175,199	402,992

### AU Movement..

Table A-IIX-7 Total Road needs to support All Wheat and **Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
Lincoln	615,448	958,520	1,573,970

## Spokane County

### Movement *I* Elevator to River Port

Table A-IX-1 County Road and highway impacts from Wheat and Barley Originating within the County for **Elevator to River Port Movement**, in dollars.

County	County Road	State Highway	Total
Spokane	8,869	1,856	10,725

### Movement *II* Farm to River Port

Table A-IX-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port Movement**, in dollars.

County	County Road	State Highway	Total
Spokane	275,985	47,701	323,686

### Movement *III* Elevator to Elevator

Table A-IX-S Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator Movement**, in dollars.

County	County Road	State Highway	Total
Spokane	27,892	18,595	46,487

### Movement *IV* Farm to Elevator

Table A-IX-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator Movement**, in dollars.

County	County Road	State Highway	Total
Spokane	83,728	3,861	87,588

### All Movements

Table A-IX-7 Total Road needs to support All **Wheat and Barley Movement** within and Through the County, in dollars.

County	County Road	State Highway	Total
Spokane	396,474	72,013	468,487

## Stevens County

### **Movement I Elevator to River Port**

Table A-X-1 County Road and highway **impacts from** Wheat and Barley Originating within the County for **Elevator** to River Port Movement, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	0	2,354	2,354

### **Movement II Farm to River Port**

Table A-X-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	0	46,816	46,816

### **Movement III Elevator to Elevator**

Table A-X-5 Road impacts from Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	0	0	0

### **Movement IV Farm to Elevator**

Table A-X-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	4,360	3,077	7,437

### *All Movements*

Table A-X-7 Total **Road** needs to support **All** Wheat and Barley Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
<b>Stevens</b>	4,360	52,246	56,606

## Walla Walla County

### Movement ***I*** Elevator to River Port

Table A-XI-1 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Walla Walla	209,726	1,045,698	1,255,424

### Movement ***II*** Farm to River Port

Table A-XT-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
Walla Walla	112,069	397,975	510,043

### Movement ***III*** Elevator to Elevator

Table A-XI-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Walls Walla	14,791	24,204	38,996

### Movement ***IV*** Farm to Elevator

Table A-XI-6 Road impacts from Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Walla Walla	233,785	84,633	318,418

### ***All*** Movements

Table A-XI-7 Total Road needs to support All **Wheat and Barley Movement** within and Through the County, in dollars.

County	County Road	State Highway	Total
Walla Walla	570371	1,552,510	2,122,881

## Whitman County

### *Movement I Elevator to River Port*

Table A-XII-1 County Road and highway impacts from Wheat and Barley Originating within the County for **Elevator** to River Port Movement, in dollars.

county	County Road	State Highway	Total
Whitman	607,188	1,365,105	1,972,293

Table A-XII-2 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Whitman County for Elevator to River Port Movement, in dollars.

County	County Road	State Highway	Total
Spokane	2,848	33,873	36,722

### *Movement II Farm to River Port*

Table A-XII-3 County Road and highway impacts from Wheat and Barley Originating within the County for **Farm** to River Port Movement, in dollars.

County	County Road	State Highway	Total
Whitman	308,307	799,977	1,108,284

Table A-XII-4 Road impacts from Wheat and Barley Originating in Other Counties and Passing Through Whitman County for **Farm** to River Port Movement, in dollars.

County	County Road	State Highway	Total
Spokane	61,330	957,429	1,018,759

### *Movement III Elevator to Elevator*

Table A-XII-5 Road impacts from Wheat and Barley Originating within the County for **Elevator** to **Elevator** Movement, in dollars.

County	County Road	State Highway	Total
Whitman	33,013	34,910	67,924

## Whitman County

(continued)

### **Movement IV Farm to Elevator**

Table A-XII-6 Road impacts **from** Wheat and Barley Originating within the County for **Farm to Elevator** Movement, **in** dollars.

County	County Road	State Highway	T o t a l
Whitman	317,182	70,181	<b>387,363</b>

### ***AN Movements***

Table A-XII-7 Total Road needs to support **All Wheat and Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
Whitman	<b>1,329,869</b>	<b>3,261,475</b>	<b>4,591,344</b>

## Yakima County

### ***Movement I Elevator to River Port***

Table A-XIII-1 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Elevator to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	0	4,747	4,747

### ***Movement II Farm to River Port***

Table A-XIII-3 County Road and highway impacts **from** Wheat and Barley Originating within the County for **Farm to River Port** Movement, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	0	29,328	29,328

### ***Movement III Elevator to Elevator***

Table A-XIII-5 Road impacts **from** Wheat and Barley Originating within the County for **Elevator to Elevator** Movement, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	0	0	0

### ***Movement IV Farm to Elevator***

Table A-XIII-6 Road impacts **from** Wheat and Barley Originating within the County for **Farm to Elevator** Movement, in dollars.

C o u n t y	County Road	State Highway	Total
<b>Yakima</b>	72,454	16,828	89,283

### ***All Movements***

Table A-XIII-7 Total Road needs to support **All** Wheat and **Barley** Movement within and Through the County, in dollars.

County	County Road	State Highway	Total
<b>Yakima</b>	72,454	50,902	123,357

## **Appendix B**

### **Ton Miles for Elevator to River Port Grain Movement**

#### **Adams County**

Table B-I-1 a For Grain Originating within Adams County

	<b>Tonmiles</b>		
county	County Road	State Highway	Total
Adams	1,546,033	8,502,793	10,048,826

Table B-I-2a For Grain **Originating** in Other Counties and **Passing** Through Adams County

	<b>Tonmiles</b>		
County	County Road	State Highway	Total
Grant	0	2,546,628	2,546,628
Lincoln	489,412	6,718,993	7,208,405
Douglas	0	412,538	412,538
Whitman	0	2,065,202	2,065,201
Total	489,412	11,743,361	12,232,772
County Total	2,035,444	20,246,153	22,281,598

#### **Benton County**

Table B-II-I a For Grain Originating within Benton County

	<b>Tonmiles</b>		
county	County Road	State Highway	Total
Benton	0	412,854	412,854

Table B-II-2a For Grain Originating in Other Counties and Passing Through Benton County

	<b>Tonmiles</b>		
County	County Road	State Highway	Total
Yakima	0	345,433	345,433
County Total	0	758,287	758,287

### Columbia County

Table B-III-1 a      For Grain Originating within Columbia County

	Tonmiles		
County	County Road	State Highway	Total
Columbia	1,611,581	4,351,768	5,963,349

### Douglas County

Table B-IV-1a      For Grain Originating within Douglas County

	Tonmiles		
County	County Road	State Highway	Total
Douglas	206,269	630,594	836,863

### Franklin County

Table B-V-1a      For Grain Originating within Franklin County

	Tonmiles		
County	County Road	State Highway	Total
Franklin	135,873	1,726,173	1,862,046

Table B-V-28      For Grain Originating in Other Counties and Passing Through Franklin County

	Tonmiles		
County	County Road	State Highway	Total
Adams	0	10,581,430	10,581,430
Benton	0	190,548	190,548
Douglas	0	1,060,812	1,060,812
Grant	0	7,019,684	7,019,685
Lincoln	0	2,710,220	2,710,220
Whitman	0	1,308,397	1,308,397
Yakima	0	122,573	122,573
Total	0	22,993,664	22,993,664
County Total	135,873	24,719,837	24,855,710

### Garfield County

Table B-VI-1a For Grain **Originating** within Garfield County

	Tonmiles		
county	County Road	State Highway	Total
Garfield	0	696,428	696,428

### Grant County

Table B-VII-1 a For Grain Originating within Grant County

	Tonmiles		
county	County Road	state Highway	Total
Grant	285,326	4,298,085	4,583,411

Table B-VII-2a For Grain Originating in Other Counties and Passing Through Grant County

	Tonmiles		
County	County Road	State Highway	Total
Douglas	0	1,573,538	1,573,538
Lincoln	70,620	1,379,444	1,450,064
Total	70,620	2,952,982	3,023,602
County Total	355,946	7,251,066	7,607,012

### Lincoln County

Table B-IX-1 a For Grain Originating within Lincoln County

	Tonmiles		
County	County Road	State Highway	Total
Lincoln	782,200	2,517,104	3,299,304

Table B-IX-2a For Grain Originating in Other Counties and Passing Through Lincoln County

	Tonmiles		
County	County Road	State Highway	Total
Stevens	0	48,750	48,750
County Total	782,200	2,565,854	3,348,054

### Spokane County

Table B-IX-1a For Grain Originating within **Spokane** County

	Tonmiles		
county	County Road	State Highway	Total
Spokane	93,042	24,122	117,164

### Stevens County

Table B-X-1a For Grain Originating within Stevens County

	Tonmiles		
County	County Road	State Highway	Total
Stevens	0	33,150	33,150

### Walla Walla County

Table B-XI-1a For Grain Originating within **Walla Walla** County

	Tonmiles		
county	County Road	State Highway	Total
Walls <b>Walla</b>	3,739,843	19,921,224	23,661,068

### Whitman County

Table B-XII-1a For Grain Originating within Whitman County

	Tonmiles		
county	County Road	State Highway	Total
Whitman	15,634,659	60,851,739	76,486,399

Table B-XII-2a For Grain Originating in Other Counties and Passing Through Whitman **County**

	Tonmiles		
county	County Road	State Highway	T o t a l
Spokane	20,676	484,163	504,839
County Total	15,655,335	61,335,902	76,991,238

Table B-XIII-1 a                      **Yakima** County  
For Grain **Originating** within Yakima County

	<b>Tonmiles</b>		
county	County Road	State Highway	Total
Yakima	0	66,858	66,858

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## Ton Miles for Farm to River Port Grain Movement

### Adams County

Table B-I-1b For Grain Originating within Adams County

	Tonmiles		
County	County Road	State Highway	Total
Adams	1,065,844	5,861,875	6,927,720

Table B-I-2b For Grain Originating in Other Counties and Passing Through Adams County

	Tonmiles		
County	County Road	State Highway	Total
Grant	0	4282,060	4,282,060
Lincoln	1,551,263	21,296,850	22,848,114
Douglas	0	3,104,556	3,104,556
Whitman	0	11,423,525	11,423,525
Total	1,551,263	40,106,991	41,658,254
County Total	2,617,107	45,968,867	48,585,974

### Benton County

Table B-II-1b For Grain Originating within Benton County

	Tonmiles		
County	County Road	State Highway	Total
Benton	0	5,386,156	5,386,156

Table B-II-2b For Grain Originating in Other Counties and Passing Through Benton County

	Tonmiles		
county	County Road	State Highway	Total
Yakima	0	2,134,168	2,134,167
County Total	0	7,520,323	7,520,323

### Columbia County

Table B-III-1b For Grain Originating within Columbia County

	Tonmiles		
County	County Road	State Highway	Total
Columbia	329,990	891,075	1,221,065

### Douglas County

Table B-IV-1b For Grain Originating within Douglas County

	Tonmiles		
County	County Road	State Highway	Total
Douglas	1,552,282	4,745,548	6,297,829

### Franklin County

Table B-V-1b For Grain Originating within Franklin County

	Tonmiles		
County	County Road	State Highway	Total
Franklin	760,830	9,665,793	10,426,623

Table B-V-2b For Grain Originating in Other Counties and Passing Through Franklin County

	Tonmiles		
County	County Road	State Highway	Total
Adams	0	7,294,903	7,294,903
Benton	0	2,485,918	2,485,918
Douglas	0	7,983,144	7,983,144
Grant	0	11,803,337	11,803,337
Lincoln	0	7,610,321	7,610,322
Whitman	0	7,237,312	7,237,312
Yakima	0	757,285	757,285
Total	0	45,172,220	45,172,220
County Total	760,830	54,838,014	55,598,844

### Garfield County

Table B-VI-1 b For Grain Originating within **Garfield** County

	Tonmiles		
county	County Road	state Highway	Total
<b>Garfield</b>	0	94,924	94,924

### Grant County

Table B-VII-1b For Grain Originating within Grant County

	Tonmiles		
County	County Road	State Highway	Total
<b>Grant</b>	479,765	7,227,068	7,706,833

Table B-VII-2b For Grain Originating in Other Counties and Passing Through Grant County

	Tonmiles		
County	County Road	State Highway	Total
<b>Douglas</b>	0	11,841,664	11,841,664
<b>Lincoln</b>	1,738,045	33,949,821	35,687,866
<b>Total</b>	1,738,045	45,791,485	47,529,530
<b>County Total</b>	2,217,811	53,018,552	55,236,363

### Lincoln County

Table B-IX-1b For Grain Originating within Lincoln County

	Tonmiles		
County	County Road	State Highway	Total
<b>Lincoln</b>	2,196,426	7,068,051	9,264,477

Table B-IX-2b For Grain Originating in Other Counties and Passing Through Lincoln County

	Tonmiles		
County	County Road	State Highway	Total
<b>Stevens</b>	0	969,674	969,674
<b>County Total</b>	2,196,426	8,037,725	10,234,151

## Spokane County

Table B-IX-lb For Grain Originating **within** Spokane County

	Tonmiles		
county	County Road	State Highway	Total
<b>Spokane</b>	<b>2,591,409</b>	<b>671,846</b>	<b>3,263,256</b>

## Stevens County

Table B-X-lb For Grain Originating within Stevens County

	Tonmiles		
County	County Road	State Highway	Total
Stevens	0	659,378	659,378

## Walla Walla County

Table B-XI-I b For Grain Originating within **Walla Walla** County

	Tonmiles		
County	County Road	State Highway	Total
<b>Walla Walla</b>	1.052288	5.605278	6.657.566

## Whitman County

Table B-XII-lb For Grain Originating within Whitman County

	Tonmiles		
County	County Road	State Highway	Total
Whitman	<b>2,894,882</b>	11267,187	<b>14,162,069</b>

Table **B-XII-2b** For Grain Originating in Other Counties and Passing Through Whitman County

	Tonmiles		
county	County Road	State Highway	Total
Spokane	575,867	<b>13,484,893</b>	<b>14,060,760</b>
<b>County Total</b>	<b>3,470,750</b>	<b>24,752,080</b>	<b>28,222,829</b>

# Yakima County

Table B-XIII-lb For Grain Origin&g within Yakima County

	Tonmiles		
county	County Road	State Highway	Total
Yakima	0	413,065	413,065

## Tonmiles for Elevator to Elevator Grain Movement

Table B-1c

	Tonmiles		
county	County Road	State Highway	Total
Adams	555,988	480,484	<b>1,036,472</b>
<b>Benton</b>	0	0	0
Columbia	162,643	39,669	<b>202,312</b>
Douglas	0	0	0
<b>Franklin</b>	0	0	0
Garfield	48,527	792,601	841,128
Grant	<b>236,321</b>	877,765	<b>1,114,086</b>
<b>Lincoln</b>	437,042	277,149	714,191
Spokane	261,901	261,901	523,803
<b>Stevens</b>	0	0	0
<b>Walla Walla</b>	138,887	340,904	479,790
<b>Whitman</b>	309,983	491,697	801,679
Yakima	0	0	0
Total	<b>2,151,291</b>	<b>3,562,169</b>	5,713,460

## Tonmiles for Farm to Elevator Grain Movement

Table B-1d

County	Tonmiles		
	County Road	State Highway	Total
<b>Adams</b>	2,133,013	505,552	2,638,565
<b>Benton</b>	312,266	277,569	589,835
<b>Columbia</b>	1,060,870	155,249	1,216,119
<b>Douglas</b>	602,233	356,649	958,882
<b>Franklin</b>	259,852	162,824	422,676
<b>Garfield</b>	1,752,254	518,492	2,270,747
<b>Grant</b>	1,912,269	855,940	2,768,209
<b>Lincoln</b>	4,867,122	2,178,546	7,045,668
<b>Spokane</b>	1,025,277	191,221	1,216,498
<b>Stevens</b>	39,905	44,727	84,631
<b>Walla Walla</b>	2,389,849	599,062	2,988,910
Whitman	2,917,634	917,545	3,835,179
<b>Yakima</b>	699,911	429,279	1,129,189
Total	19,972,455	7,192,654	27,165,109